The Veterinary Record, April 30th, 1960 Price 2s.

RECEIVED
MAY 19
VET. MED. LIBRARY

THE JOURNAL OF THE BRITISH VETERINARY ASSOCIATION

The Veterinary Record

OHIO STATE UNIVERSITY
MAY 18 1960

PATRON: HER MAJESTY THE QUEEN

Vol. 72 No. 18 Issue No. 4275 335-354

Registered as a Newspaper

DO YOU KNOW THAT

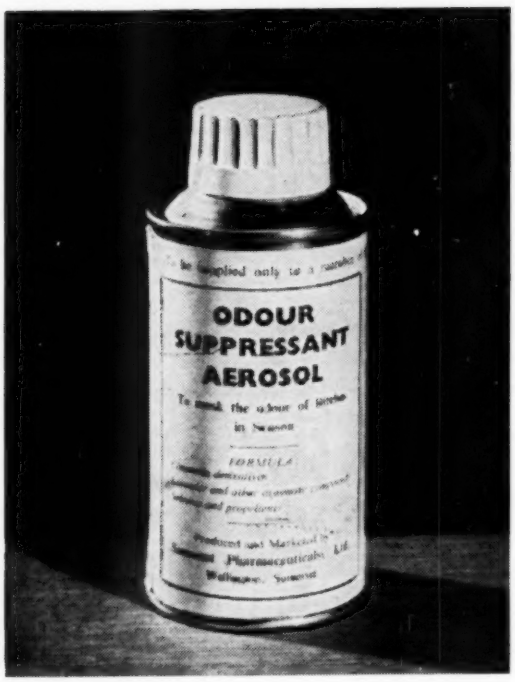
BIOGLAN natural vitamin-E

increases stamina
improves muscle tone and oxygen utilization by the tissues
prevents 'cramp'
calms excitable and nervous animals
reduces heart strain
influences female fertility
enhances sperm quality . . . for which purposes it is employed by many veterinary surgeons, breeders, owners and trainers.

Supplied in tablets or powder for large animals, it is inexpensive, completely safe and easy to administer, but it *must* be a stable derivative of *natural* alpha tocopherol which combines uniform strength and high concentration with complete absorption.

Full Details Available from:— **BIOGLAN LABORATORIES LTD**

(VETERINARY DIVISION) HERTFORD, HERTS. **Phone: CUFFLEY 2137**
Available in the Republic of Ireland from: Webber Pharmaceuticals (Ireland) Ltd., 58, Harcourt Street, Dublin. Phone: 54715



ECTOPARASITE AEROSOL for the destruction of lice, fleas and other ectoparasites on small and large animals. Does not stain fleece or fur.

142 gm. units in cases of 6 and 12.

AEROSOL 1053—an efficient combination of insecticidal and deodorising materials.

142 gm. units in cases of 6 and 12.

ODOUR SUPPRESSANT AEROSOL—to mask the odour of bitches in season.

142 gm. units in cases of 6 and 12.

CHLORAMPHENICOL AEROSOL—for the treatment of foot-rot in sheep.

114 gm. units in cases of 6 and 12.

SOMERSET PHARMACEUTICALS LTD
WELLINGTON, SOMERSET-*Phone:* **Wellington, Som. 2244**

THE VETERINARY RECORD

Founded by William Hunting, F.R.C.V.S., in 1888

Volume 72
No. 18

SATURDAY, APRIL 30th, 1960

7 Mansfield Street,
London, W.1.
Museum 6541

Disc Protrusions in the Cat: Distribution of Dorsal Protrusions Along the Vertebral Column

BY

A. S. KING and R. N. SMITH

**Department of Veterinary Anatomy,
University of Bristol**

SUMMARY.—The distribution of dorsal protrusions has been investigated in 100 adult cats. Half of these cats were included in an earlier paper and the rest are new. The more severe varieties of protrusion (perforating protrusions and large bulging protrusions taken together) were somewhat more common in the cervical region than in the region from T10 to S1; perforating protrusions appeared to be about equally common in these two regions. In the region of the conjugal ligament protrusions were rare. Unlike the distribution in the dog, the incidence of protrusions round the thoracolumbar junction was low. When small bulging protrusions were included the incidence of protrusions was very much higher in the cervical region, especially at C2-3, than in the region from T10 to S1. There was some suggestion of a peak in incidence at the mid-lumbar region. The high incidence in the cervical region is more interesting mechanically than clinically.

Introduction

IN 1958 we described the general nature of dorsal protrusions of the intervertebral disc in the cat, including their distribution along the vertebral column (King, Smith, & Kon, 1958). This work was based on examination of 100 adult cats. In the first 50 of these cats the discs were only transected when a dorsal protrusion had already been detected. In the second 50 every disc was transected and also other minor refinements of technique were introduced; these changes gave a more accurate assessment of protrusions. The same improved methods have been used recently to investigate another 50 cats of known ages, the main object being to discover the age incidence of dorsal protrusions (King & Smith, in preparation). We therefore have 100 cats investigated by the same improved methods. The distribution of dorsal protrusions observed in these cats is more accurate than that in the original 100. This paper reports the results obtained. In addition to their possible clinical implications, these data are essential to the ultimate understanding of the fundamental mechanical factors which must underlie the diseases of the disc.

Materials and Methods

One hundred cats were investigated. From the degree of fusion of the epiphyses or from information from the owner it was established that all the animals were at least 2 years old. The first 50 were taken at random; most of the second 50 were also taken at random but some were selected from ages under 6 and over 16 years old. All the cats were brought to veterinary surgeons for destruction. None was known to be a clinical case of disc protrusion or of any similar condition.

In every cat the dorsal aspect of each disc was examined for protrusions. Every disc was then cut transversely and the cut surface was examined. A dissecting microscope was used throughout. The coccygeal discs were not examined. Most of the cats were fixed in formalin, but a few were examined fresh.

For statistical analysis, the chi-squared test was used to compare the incidence of degeneration in one region of the vertebral column as a whole with the incidence in another region as a whole. The standard error test for proportions was used to compare the incidence at one individual disc with the incidence at the other discs as a whole in the same region of the vertebral column.

Results

One hundred and thirty-five dorsal protrusions were found; their distribution along the vertebral column is summarised in the histogram. The protrusions have been classified into three varieties, type 1, large protrusions of type 2, and small protrusions of type

XUM

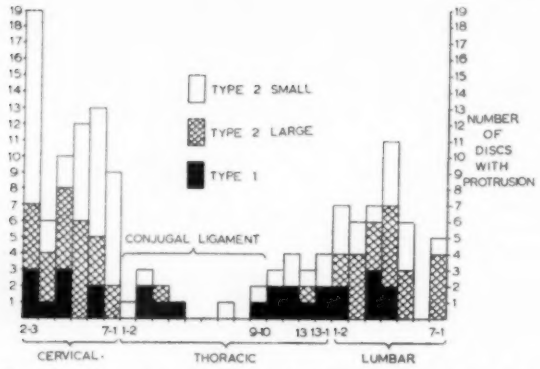


FIG. 1.—Histogram showing the distribution along the vertebral column in 100 adult cats of 135 dorsal protrusions of three varieties.

2; in protrusions of type 1 the annulus fibrosus was completely perforated and in those of type 2 it was bulging. Of these 3 varieties there were altogether 28, 46 and 61 respectively, or 20.7 per cent. 34.1 per cent. and 45.2 per cent. The distribution of each variety is shown in the histogram. Sometimes a disc had more than one protrusion: if it had both a type 1 and a type 2 protrusion it was classified as a type 1 protrusion; if it had both a large and a small protrusion of type 2 it was classified as a large protrusion of type 2; a disc classified as having a small protrusion of type 2 had this variety only.

Cervical region. This contained 6 discs, from C2-3 to C7-T1 inclusive. Protrusions were more numerous here than in the region from T10 to S1, provided all 3 varieties of protrusion were considered together; there were 69 protrusions (51.1 per cent. of the total) in the cervical region compared with 56 (41.5 per cent.) from T10 to S1. Statistically this difference was very highly significant (at the level of 0.001 per cent.). Within the cervical region itself only the disc C2-3 had an incidence which was significantly different (at the level of 5 per cent.) from the other discs in the cervical group.

When the incidence of protrusions of type 1 and that of large protrusions of type 2 were considered together, two main differences in the distribution emerged. First, the incidence in the cervical region no longer exceeded the incidence in the region from T10 to S1 by such a great degree: nevertheless there were still proportionately more protrusions in the cervical region (32 protrusions distributed between 6 discs) than in the thoracolumbar region (36 protrusions distributed between 11 discs), and this difference was still significant (at the level of 5 per cent.). Secondly, the incidence at C2-3 was no longer important. In fact in the cervical region the only disc to stand out statistically was C7-T1; in this disc the incidence was significantly lower than the incidence in the other 5 cervical discs.

When type 1 protrusions alone were considered the difference in the incidence between the cervical region and the region from T10 to S1 disappeared completely. Nine type 1 protrusions were distributed among the 6 cervical discs and 14 among the 11 discs between T10 and S1, a similar incidence.

Region of the conjugal ligament. The 9 discs in this region (T1-2 to T9-10) are all covered by the conjugal ligament as in the dog; (the disc T10-11 quite often has a conjugal ligament in the cat, but for simplicity this has been disregarded here). Few protrusions occurred here (7.4 per cent of the total). Relatively more protrusions were found at the cranial and caudal ends than in the middle of the region, but these differences were not significant statistically. Protrusions of type 1 accounted for half of the protrusions in this region.

Region from T10 to S1. In the 11 discs in this region there appeared to be a progressive rise in incidence with a peak at L4-5, followed by a sharp fall. This seemed to apply regardless of whether all 3 varieties of protrusion were considered, or only the combination of type 1 and large protrusions of type 2. However, the significance of this curve could not be confirmed statistically.

When all 3 varieties were considered, the low incidence at L6-7 was highly significant(at the level of 0.1 per cent), when compared with the incidence at the other 10 discs in the group. No other disc had an incidence which differed significantly from the rest of the group, although the apparently high incidence at L4-5 was within the 10 per cent. level and only just outside the 5 per cent. level.

When type 1 protrusions and large protrusions of type 2 were considered together, L6-7 was again the only disc to stand out statistically, its incidence being significantly lower than the rest of the thoracolumbar group (at the level of 5 per cent.). (In the statistical tests of the incidence at L6-7 an incidence of 0.5 protrusions at this disc was assumed.)

Discussion

In general, dorsal protrusions were very much more common in the cervical region than in the region from T10 to S1. The incidence was conspicuously high at the first cervical disc. These two conclusions only applied, however, when all protrusions were considered including the small ones of type 2. When the latter were excluded protrusions still remained more common in the cervical region but the degree of difference was not nearly so great; furthermore the incidence at the first cervical disc was then no higher than the incidence at the rest of the cervical discs. When type 1 protrusions alone were considered the incidence in the region from T10 to S1 was much the same as in the cervical region.

For clinical purposes the small protrusions of type 2 can be ignored. They were extremely small and it is inconceivable that they could ever have caused any symptoms by damaging the spinal cord or spinal nerves. Therefore, clinically, protrusions in the neck are not likely to be much more important than those in the region from T10 to S1. In fact if symptoms ever do occur in this species they would probably affect the hind limb as often as the fore limb or neck. This is because as many protrusions of type 1 were found in the discs between T10 to S1 as in the discs of the neck. Olsson (1951) and Hansen (1952) have indicated that type 1 protrusions are

relatively more dangerous than those of type 2 in the dog, and for the time being it seems reasonable to assume the same for the cat. Unlike the dog, protrusions were not common at the thoracolumbar junction. If there is a peak of incidence anywhere in the region from T10 to S1 it is mid-lumbar around L4-5, but more observations are needed to clear up this point.

The fundamental clinical question remains unanswered—do these lesions cause symptoms? The fact that so many protrusions were found in this investigation and yet not one of the cats was a recognised clinical case suggests that the large majority never cause objective symptoms. This, of course, is true for the dog, and probably for man also. Nevertheless we have a strong impression that disc protrusions cause much less trouble in the cat than in the other two species. Certainly great caution is necessary in attributing paresis or paralysis in the cat to any protrusions which may be found *post mortem*.

The distribution of all varieties of dorsal protrusions, including the small ones of type 2, may be of interest mechanically. The high incidence recorded at C2-3 was probably not in fact as high as it should have been. This disc was specially liable to *post mortem* damage during preparation of the vertebral column, because of the weight of the head; several suspected protrusions here were not counted because the disc was accidentally torn. Eventually one must ask why protrusions should be so common at this disc. Similarly the signs of a peak in the mid-lumbar region (if confirmed) will have to be accounted for. Even more curious is the absence of protrusions at L6-7. These features of the distribution of protrusions presumably depend on anatomical factors, especially mechanical ones, which at present are scarcely understood at all (King & Smith, 1958).

As in the dog the region of the conjugal ligament (T1-2 to T9-10) seems relatively safe from protrusion, but the reason even for this is just as much a mystery in the cat as in the dog. The ligament itself must certainly support the disc to some extent. But the nine ligaments vary in thickness in the cat just as in the dog (King, 1956), the first and last of the series being relatively delicate: if thickness of the ligament were the only factor the discs T1-2 and T9-10 should have more protrusions than the other 7 in the group.

Of the errors that may arise in this sort of investigation two need comment. First there is the difficulty of deciding what to count as a protrusion. In our earlier paper (King, Smith & Kon, 1958) we laid down criteria for identifying protrusions of types 1 and 2. Those of type 1 have been retained, but those of type 2 were too stringent. For type 2 protrusions they demanded a certain degree of size, and this caused the smallest ones to be left out of the histogram given in that paper. In this paper the smallest ones have been included (among the small protrusions of type 2 referred to above), and this has the advantage of perhaps giving an insight into the earliest stages in protrusion. On the other hand it creates new difficulties in recognising a protrusion. Some small irregularities of the dorsal surface of the disc arise from quite different causes. For example a disc may bulge if the vertebral column is fixed in a position of abnormal curvature; also the surface of a disc may be irregular apparently through contraction of a fibrous nucleus pulposus, the impression being that the surface is pitted rather than elevated. Sometimes these sorts of irregularities must inevitably have been counted as protrusions. To limit this source of error we used 3 rules. 1. The inside of the disc must show definite degeneration, with some rupture or distinct distortion of lamellae; this guards against counting as a protrusion a disc which is perfectly normal but distorted by fixation of the vertebral column in a bent position. 2. A protrusion must project above the surface of the disc as a whole; this is to exclude an apparent projection caused by pitting of the surrounding surface. 3. Doubtful protrusions must be left out.

Secondly there is the possibility that dorsal protrusions can be created *post mortem* by rough handling of the vertebral column. As a source of error this could be really serious. After the neural arches have been removed much strain is thrown on the disc if the vertebral column is carelessly handled, and if the discs are already severely degenerate they can easily get broken. However, we have looked into this carefully and found that, although some splitting of the annulus may readily occur, protrusions resembling those of type 1 or type 2 never do. In fact it is very striking that it actually seems impossible to create a protrusion of type 1 or type 2 by manipulating the vertebrae; this in itself is something which needs explaining. But as a source of error in this survey we believe it is not important.

Acknowledgments.—We would like to thank Professor C. W. Ottaway for his support. We are much indebted to our colleagues in practice in this city for their valuable co-operation. In particular we are grateful to G. M. Clarke, head of the statistical unit of the Horticultural Research Station at Long Ashton, for directing the statistical analysis.

References

HANSEN, H. J. (1952). *Acta orthopaed. scand.* Suppl. 11.
KING, A. S. (1956). *Vet. Rec.* **68**. 939.
———, & SMITH, R. N. (1958). *Nature.* **181**. 568.
———, ———, & KON, V. M. (1958). *Vet. Rec.* **70**. 509.
OLSSON, S. E. (1951). *Acta orthopaed. scand.* Suppl. 8.

A SUCCESSFUL INCOME TAX APPEAL

Members who attended the meeting of Council in Edinburgh last week will have learned with satisfaction of the successful outcome of an income tax appeal by the Southern Counties Veterinary Society. The purport of this successful appeal is that the Society has been found to come under the definition of "a body of persons not of a mainly local character," and its members thus become entitled to the deduction of their subscriptions as expenses under Schedule E.

While this result is gratifying, it must be emphasised that the decision *will not necessarily apply to other Divisions of the B.V.A.* Their claims to have Divisional subscriptions treated as business expenses will have to be decided strictly on an individual basis.

Milk Fever

BY

C. M. GOULD and F. C. GRIMES

Southampton

SUMMARY.—(1) *The relationship between serum glutamic-oxaloacetic transaminase activity and length of recumbency in cases of milk fever is surveyed.*

(2) *Possible causes are discussed.*

Introduction

HUMAN blood serum exhibits a number of different transaminase activities and of these the glutamic-oxaloacetic transaminase (G.O.T.) has proved of considerable value in the detection of necrosis of heart and liver cells (Baron, Alexander, Bell & Oakley, 1958; Keele, Goulden & Newman, 1958; La Due, Wroblewski & Karmen, 1954). As every other tissue in all animals investigated has a definite G.O.T. activity, destruction of these tissues (*e.g.* skeletal muscle, lung) may produce elevated serum levels. The simple method of estimation of Reitman and Frankel (1957) using a visual range photometer has brought the test within the scope of the ordinary clinical laboratory. It seemed possible that this determination might prove valuable for the detection of liver cell necrosis in cattle and this was investigated with reference to possible interference by destruction of other tissues (Gould & Grimes, 1959). This initial investigation was encouraging in that it seemed possible that as a prognostic test it might have considerable value in a number of conditions. One such condition was milk fever, where we associated serum glutamic-oxaloacetic transaminase (S.G.O.T.) activities with length of recumbency. We now report the result of a survey of 60 cases which we believe to have clarified this relationship.

Methods. Sixty cases of milk fever, uncomplicated by enteritis or mastitis—most of them supported by serum calcium and magnesium estimations—were tested for S.G.O.T. activity by the method of Reitman and Frankel (1957) using a visual range photometer. Routine treatment was given—350 ml. 25 per cent. calcium borogluconate intravenously and a calcium magnesium mixture* subcutaneously. If the cow had not risen in 4 to 6 hours this treatment was repeated. Some cases were followed with S.G.O.T. estimations for 3 or more days.

For comparison the S.G.O.T. activities of 20 apparently normal heifers and cows at or near parturition were estimated, some of them for 3 days in succession.

Results

(1) S.G.O.T. activity in Frankel (F) units of normal animals within ±4 days of calving. 41, 60, 60, 60, 64, 66, 70, 70, 72, 77, 79, 82, 82, 82, 91, 92, 92, 93, 97, 97, 102, 113, 124, 129.

(2) S.G.O.T. activity (in F units) of cases of clinical milk fever, never recumbent.

(a) no relapse later. 48, 59, 59, 62, 67, 68, 70, 71, 78, 86, 100, 102, 104, 106.

(b) relapsed later. 82, 120.

(c) on relapse, 74.

(3) S.G.O.T. activity (in F units) of cases of clinical milk fever and its relation to length of recumbency.

Serial S.G.O.T. activities (in F units) in various groups

Group A. Normal heifers, from the day of calving or the day after, daily for 3 days.

HEIFER 1. 79, 72, 64.
HEIFER 2. 93, 124, 92.
HEIFER 3. 102, 129, 113.

Group B. Cases of milk fever "up at once," daily for 3 days.

COW 1. 84, 91, 77.
COW 2. 86, 84, 80.
COW 3. 108, 125, 91.

Group C. Cases of milk fever up at once but relapsed on second day.

* M.F.C. May & Baker.

TABLE I

Time recumbent before treatment	Time required to rise after treatment (in hours)					
	Less than 2	2–4	4–8	8–12	12–16	Longer
Up to 2 hours—no relapse...	63, 73, 74, 78, 84, 86, 86, 91, 112, 114	84, 93, 96, 112, 122	140, 144, 156		370	400
Relapsed later	116					
On relapse	260					
2 to 8 hours or "overnight" —no relapse	68, 70, 72, 83, 92, 108, 112, 120, 127, 170	124, 177, 192	82, 165, 192, 232			3120
Longer than 8 hours—no relapse	224*	172*				460*

* These 3 animals had received calcium borogluconate subcutaneously when they were first noticed recumbent.

COW 1. 82, 136, 157.
COW 2. 120, X, 240.
COW 3. X, X, 260.

Group D. Cases of milk fever down 5 to 8 hours.
COW 1. 124, 204, 184.
COW 2. 156, 320, 300, 230 and 7 days later 74.

Group E. Cases of milk fever down a long time or never up, but eating after treatment.
COW 1. 3120, 1640, 925.
COW 2. 400, 2400, 2400. The left hind leg of this cow was especially weak. She was slaughtered. On autopsy extensive "bruising" was found involving all the muscles of that hindquarter (192 lb. dead weight).

Group F. Obturator paralysis, both able to rise.
COW 1. 93.
COW 2. 137.

Group G. Case down 24 hours when seen, up immediately after treatment, but did not eat concentrates for several days.
COW 1. 600, 1000, 1100.

Group H. Case of milk fever down, she never ate after treatment and died.
COW 1. 460. When first seen 36 hours after down, she had been given calcium borogluconate subcutaneously the day before. On the next day it had risen to 2000. She died that night. On autopsy fatty degeneration of the liver, heart and kidneys was found.

These figures indicate that the peak of S.G.O.T. activity is often delayed until the day following the onset of milk fever, as in cases of cardiac infarct in man.

Discussion

Primarily milk fever appears to be caused by the drainage of calcium and phosphorus into the colostrum (Robertson, Marr & Moodie, 1956). Hypocalcaemia at times other than calving is often associated either with some obvious nutritional cause or with oestrus, or at least with an oestral discharge from the uterus (Messervy, 1948). This association with oestrus is generally recognised, but curiously enough it is seldom mentioned in descriptions of this condition. At both parturition and probably at oestrus the S.G.O.T. activity is increased a little (see Table II). S.G.O.T. activity is also increased in milk fever so it seems possible that the decreased progesterone activity, the increased oestrogen activity, or both at the time of calving, play a more important part in this condition than is at the moment recognised.

TABLE II

	Number of estimations	Arithmetic mean, F. units	Range, F. units
Normal range (excluding 6 at oestrus) ...	28	62·1	38–102
Cows at oestrus ...	6	75·5	60– 94
Cows at parturition or after	23	87·8	60–129

The rapid clinical response to calcium alone has caused surprise to some. In fact this is to be expected. Heart muscle preparations can function in Ringer's or Locke's solution for some considerable time despite the complete absence of phosphate, but not in the absence of calcium. This is clear evidence of the inability of cells to store calcium, and of their well-known ability to absorb and retain phosphate, binding it chemically.

When recumbency is associated with an obturator paralysis, no large increase of S.G.O.T. activity occurs. Presumably this is also true when a leg is broken or the hip luxated. Otherwise the length of recumbency appears to be closely related to increased S.G.O.T. activity. Relapses appear to be similarly related. Since this increased activity is widely held to be due to leakage from damaged cells, some pathological changes must be presumed to have occurred.

In the 2 cases autopsied such changes were observed. In others, paresis was associated with lack of response to galvanic stimulation of the muscle. It is our impression that recovery is also associated with increased response to such stimulation.

In our experience few tissues are able to leak sufficient G.O.T. to produce such high serum activities as were observed here in milk fever with prolonged recumbency. Activities have been observed in fatal hypomagnesaemia of up to 260 F. units, presumably from the characteristic heart lesion, in liver failure up to 2000 F. units, in a fatal case of gamma-benzene hexachloride poisoning up to 2700 F. units, in pneumonia up to 280 F. units (¼ of each lung involved), in radial paralysis in a calf up to 300 F. units, in "bruising" of large amounts of muscle—probably tearing of muscle as well—up to 2400 F. units, in white muscle disease in a calf up to 890 F. units (Kutler & Marble, 1958), in fatal acute toxaemia or septicaemia up to 375 F. units, in complete lysis of blood up to 1500 F. units, and in blood taken 5 hours after death up to 400 F. units (180 F. units at the time of death).

Of these examples only skeletal muscle leakage is not accompanied by anorexia. We therefore consider that greatly raised S.G.O.T. activity (more than 600 units) without anorexia is indicative mainly of muscle leakage which is the result of muscle damage, such as the rupture of the gastrocnemius tendon and muscle described by Messervy (1948). If the recumbent animal does not eat, a greatly increased S.G.O.T. activity is mainly the result of fatty change of the liver. This confirms impressions gained by autopsies and other reports. Smaller increases are presumed to be the result of lesser degrees of destruction of liver, muscle, or both.

Prolonged recumbency is also associated with low plasma inorganic phosphate (Robertson *et al.* 1956). In the past sodium acid phosphate has been recommended for this condition. Its lack of success is paralleled by that of the multiplicity of alternative treatments known to us, *e.g.*, udder inflation, ACTH and the cortisones, choline chloride, glucose, glycerine, vitamins B1 and B12, strychnine and cocaine. The finding of raised S.G.O.T. levels has

(*Concluded at foot of col. 1 overleaf*)

The Formation of a Pseudoarthrosis in a Cow Following Luxation of a Hip Joint

BY

E. F. LEWIS

Royal Veterinary College, Hawkshead Lane, North Mimms, Hatfield, Herts.

THE modern trend in the treatment in the dog and cat of those hip luxations which prove to be irreducible, or in which reduction cannot be maintained, has been to attempt ingenious surgical means of restoring normal hip function. It has been long established, however, that in the majority of instances there will be a complete return of limb use without the aid of surgery or any form of support. In these cases the femoral head usually becomes accommodated at the base of the ilium and a pseudoarthrosis (false joint) is formed. Judging by the time taken for the dog to become sound it would seem that the pseudoarthrosis is formed in from 2 to 3 months.

Luxation of the hip occurs much less frequently in cattle than in small animals. The method of reduction described by Holroyd (1944) has been found eminently successful in the author's experience. On those occasions, however, when there has been delay, reduction of the luxation is usually impossible, the animal as a rule being sent for slaughter. For this reason little evidence is available concerning the outcome of such cases. Casual reference is made in the literature to the formation of a false joint in cattle but definite proof that this actually happens is lacking. The author has known a few cows, valuable for breeding, to be kept despite failure of the operator to reduce hip luxations. In these animals sufficient locomotory use was regained to enable them to get about slowly and without undue pain. It was not until recently that the opportunity arose for the *ante-* and *post-mortem* examination of a cow with an unreduced luxation of long standing. Here dissection revealed the formation of a false joint which resembled most remarkably the normal femoro-acetabular joint.

Case History

The animal was a cross-bred Aberdeen Angus cow, 3½ years of age. She had calved some time previously and had been lame on the left hind leg for approximately 6 months. Although comparatively severe, this lameness had not materially interfered with the cow's usefulness and she was retained in the herd until deterioration in general body condition, together with intermittent bouts of diarrhoea, caused the owner to suspect the presence of Johne's disease. The cow was therefore sold to a knacker who delivered her to the Department of Medicine as a clinical case for teaching purposes.

During the time the cow was kept at the Field Station she was able at first to rise unaided, the affected limb being moderately adducted when standing and walking. Over the left hip joint there was a pronounced, hard, roughly oval swelling which extended from midway between the tuber ischii and the acetabulum to within a few inches of the tuber coxae, while in the dorsal direction it reached the edge of the sacrum. The great trochanter of the femur, when compared with that on the right side, could be palpated in a position antero-dorsal to its normal situation.

Liquid faeces were being passed in great quantities and the cow showed no desire for food and little for water. Several samples of faeces were examined for Johne's bacilli with negative result, but a complement fixation test for Johne's disease carried out on the animal's serum proved positive. A week after admission the cow became very dehydrated, had difficulty in rising, and was destroyed.

Post-mortem Findings

The small intestine showed extensive corrugations and Johne's bacilli were found easily in mucosal scrapings.

The left femoral head was articulating on the lateral face of the ischiatic spine in a position approximately 4 inches antero-dorsal to the acetabulum. Except for some restriction in abduction an almost normal range of hip movement was possible. The pseudoarthrosis was surrounded by thick, tough tissue which was acting as a joint capsule. When the latter structure was incised, fluid, which had a marked resemblance to synovia in colour and viscosity, ran freely from the false joint cavity.

The pseudoarthrosis (Fig. 1A) had a roughly oval outline that measured 2¾ inches antero-posteriorly and 2 inches in the dorso-ventral direction. Its floor was flat and smooth, the central portion being eburnated where it had been in direct contact with the femoral head. The upper limit of the cavity resembled an overhanging roof some 1½ inches deep

(*Concluded at foot of col. 1 overleaf*)

Milk Fever.—*Concluded.*

caused us to investigate vitamin E and sodium selenite—but results are as yet inconclusive.

Acknowledgments.—We wish to thank the Biochemical Laboratory, Weybridge, for carrying out serum calcium and magnesium estimations, Mr. Welch and his staff at the Biochemistry Department, Southampton Group Hospitals for their estimations and long-suffering good humour, and all others who assisted us.

References

BARON, D. N., ALEXANDER, C. P., BELL, S. L., & OAKLEY, C. M. (1958). *Quart. J. Med.* **27.** 533.
KEELE, K. D., GOULDEN, F., & NEWMAN, M. J. (1958). *Lancet.* **ii.** 1, 187.
LA DUE, J. S., WROBLEWSKI, F., & KARMEN, A. (1954). *Science.* **120.** 497.
REITMAN, S., & FRANKEL, S. (1957). *Am. J. Clin. Path.* **28.** 1.
GOULD, C. M., & GRIMES, F. C. (1959). *Vet. Rec.* **71.** 586.
ROBERTSON, A., MARR, A., & MOODIE, E. W. (1956). *Ibid.* **68.** 173.
MESSERVY, A. (1948). Conference on Grassland and Animal Health. B.V.A. Publication No. 17. p. 93.
KUTLER, K. L., & MARBLE, D. W. (1958). *Am. J. Vet. Res.* **72.** 632.

E. F. LEWIS—THE FORMATION OF A PSEUDOARTHROSIS IN A COW FOLLOWING LUXATION OF A HIP JOINT

FIG. 1.—Pseudoarthrosis of hip joint. The head of the femur (B) has been freed and reflected forwards.

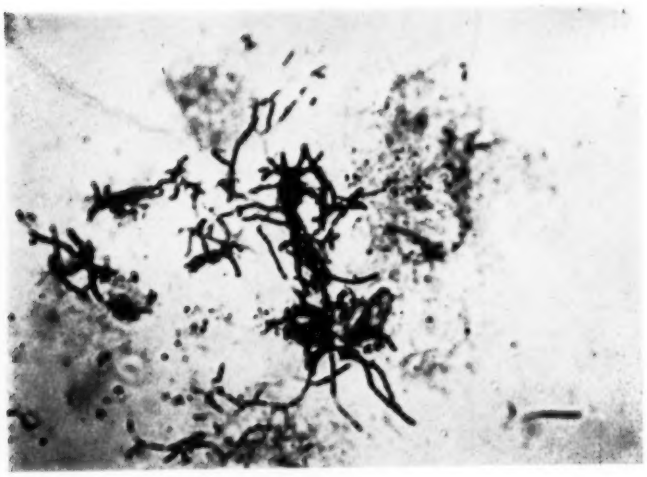


FIG. 1.—*N. farcinicus* isolated from an udder lesion (10 days culture). Ziehl-Neelsen stain.

FIG. 2. Section of an udder nodule. Haematoxylin and eosin stain.

Nocardiosis of the Bovine Udder and Testis

BY

F. I. AWAD

Research Division, Ministry of Animal Resources, Khartoum, Sudan

SUMMARY.—1. The present investigation deals with nocardiosis of the bovine udder and testis.

2. From all cases investigated the aerobic acid-fast N. farcinica *was demonstrated.*

3. The histopathological similarity to tuberculosis is indicated.

4. The importance of udder and testis infection from the economic point of view has also been shown.

NOCARDIA farcinica infection of bovine animals is fairly common in the Sudan.

Awad and Karib (1958) studied nocardiosis among cattle in the Sudan and reported that 2 distinct types of the disease occur. There is a superficial type, with a chronic purulo-granulomatous inflammation of the subcutis involving the lymph nodes and vessels, and also an internal type, the pulmonary form of which closely resembles tuberculosis.

Awad (1958) studied the inter-relationship between tuberculosis and nocardiosis in cattle and indicated that the study of nocardiosis in the Sudan is of much importance, as it may apparently sensitise animals to tuberculin and so cause a major complication in interpreting the results of tuberculin testing.

Nocardiosis of the udder and testis appeared to constitute an important part of this problem.

Cases and Material

1. Udder Infection

Field Cases

Two cases of udder infection were seen at Malakal. The first case, a 6-year-old cow, showed extremely large and hard rear hind quarters of the udder, which on palpation appeared to be due to diffuse fibrosis. There was no acute inflammation and no febrile reaction. In the position of the supramammary lymph node a large, hard, lobulated mass could be felt. The secretion of the affected quarters was mainly pus.

The second case, a cow of about the same age, was affected only in the left hind quarter, which revealed on palpation areas composed of discrete hard lumps ; there was no acute inflammation or febrile reaction. The supramammary lymph node appeared normal. On milking, the affected quarter yielded a watery type of milk containing obvious clots of pus.

Unfortunately, the owners refused to give up the animals for *post-mortem* examination.

Smears prepared from the udder secretion of the 2 cases and stained by the Ziehl-Neelsen method, using 15 per cent. sulphuric acid as a decolorising agent, revealed the presence of branching acid-fast filaments. The organisms were gram-positive.

After the addition of 500 units of penicillin per ml., the secretion was incubated for 20 minutes at 37° C., cultured on Lowenstein's medium (Jensen, 1953), and incubated at 37° C. Nine days later, small discrete round yellowish leathery colonies appeared on media inoculated from the first, but not from the second, case. Smears prepared from the colonies showed branching acid-fast filaments (see Fig. 1).

One ml. of penicillin-treated udder secretion from each case was inoculated subcutaneously into a guinea-pig. Eighteen days later localised abscesses developed at the sites of inoculation and discharged pasty pus. Smears prepared from the pus showed the acid-fast filaments typical of *N. farcinica.*

Slaughterhouse Material

These included 9 cases of udder lesions and 3 of testis lesions.

Udders. Seven out of the 9 cases were reported by the abattoir staff as showing lesions of tuberculosis.

To the naked eye, the grey-white silky appearance and flaccid touch of the normal udder was replaced by firm dark-yellow tissue. On examining the cut surfaces of the affected udders, 3 of them showed several thick-walled lesions, of different sizes, filled with pasty pus. In one other case there was only one small nodule about 3 mm. in diameter, and in the remaining 5 cases the lesion appeared in the form of a single large thick-walled abscess, sometimes involv-

---

The Formation of a Pseudoarthrosis in a Cow.—*Concluded.*

consisting of a thick mass of new bone that had strong attachment to the upper edge of the ileum. The anterior and posterior walls were similarly constructed of dense fibrous tissue and osteophytic outgrowths.

The femoral head (Fig. 1B) was unaltered in shape except for a circular area, 1 inch in diameter, on its medial aspect that was flat and eburnated as a result of friction on the ilium. The cartilage on the rest of its surface was thin and reddened. A ragged piece of the teres ligament, about ¾-inch long, remained attached to the fovea capitis.

The acetabulum (Fig. 1C) showed many and marked changes. In the antero-dorsal aspect the cotyloid ligament had been almost completely destroyed and the acetabular rim here was exposed and eburnated. Little cartilage remained on the upper half of the acetabulum and in its lower half, the articular surface, as well as the acetabular fossa, was obscured by a mass of dense fibrous tissue.

The position of the sciatic nerve (Fig. 1D) which normally passes just above the hip joint, had been moved considerably in the dorsal direction. The nerve, however, was in no way compressed by this alteration in its passage.

Acknowledgments.—The author wishes to thank Mr. L. C. Vaughan, F.R.C.V.S., for his interest and technical assistance in the preparation of this communication.

Reference

HOLROYD, H. (1944). *Vet. Rec.* **56.** 222.

ing the whole quarter. The supramammary lymph node was found to be affected in 4 cases.

Smears prepared from the lesions showed the presence of typical acid-fast *N. farcinica* in only 7 of the 9 cases.

Penicillin-treated material from each case was inoculated into Lowenstein media, but only 2 of them showed growth 10 days later, smears of the colonies revealing the presence of acid-fast *N. farcinica*.

One ml. of penicillin-treated material from each case was inoculated subcutaneously into male guinea-pigs. Localised abscesses developed at the sites of inoculation 15 days later, and 3 of the guinea-pigs showed signs of orchitis. When the animals were killed 45 days after inoculation, no internal lesions could be detected apart from the severe orchitis which had developed in these 3 guinea-pigs. The organism was demonstrated in smears of pus from the 9 inoculated guinea-pigs.

Sections prepared from early udder lesions show a large number of plasma and endothelioid cells in the interacinar spaces, while in older lesions the histopathological picture is typical of that described by Awad and Karib (1958) (Fig. 2).

Out of the 9 affected cows, only 1 was reported as having lesions confined to the udder. The other 8 cows all showed lesions in other organs, mainly the lungs and their lymph nodes, the lymph nodes of the head, and other lymph nodes of the body. Three udders had lesions in 2 quarters, but the remaining 6 had lesions in only 1 quarter.

2. Testis Infection

In 2 cases one testis only was affected but in the third case both testes showed lesions.

In the first 2 cases the testes appeared 2 to 3 times their normal size and when cut were found to consist almost entirely of pus within capsules formed by the thickened tunics of the testes. In the third case, small nodules up to 5 cm. were seen in both testes.

Smears prepared from the 3 cases revealed the presence of gram-positive acid-fast organisms resembling *N. farcinica*. No growth could be obtained on Lowenstein's medium. From each case, 1 ml. of penicillin-treated pus was inoculated subcutaneously into a guinea-pig. The 3 inoculated animals behaved as did the previously injected guinea-pigs, but only 1 developed orchitis.

In these 3 bulls, the lungs and their lymph nodes were affected, as well as the testes.

Discussion

The observations of Awad and Karib (1958) and Awad (1958) are of considerable interest in view of the relationship that appears to exist between *N. farcinica* and *M. tuberculosis*, while the diseases they produce have also many points in common. On the basis of their studies, it has become the policy of this laboratory to examine specimens suspected of containing nocardia routinely for tubercle bacilli. The simplest method of differentiation is by guinea-pig inoculation, a procedure adopted in the present investigation.

The histopathological examination of udder lesions showed the presence of extensive infiltration of new connective tissue cells, endothelioid cells and a few giant cells. In some sections the glandular structure had been entirely replaced by this infiltration. This pathological study shows that the udder lesions are similar to those described in M'Fadyean's (1917) classical account of the pathological changes in bovine tuberculous mastitis.

In the early stages of nocardiosis nodules form in the testis similar to those found in other organs ; but in the later stages, it tends to destroy the glandular structure and the whole testis is transformed into an abscess of which the capsule is formed by the tunica vaginalis. It seems that the organism has an affinity for attacking the testis as shown by the result of guinea-pig inoculations.

A definite diagnosis of the disease would require identification of the causative organism, as the macroscopic as well as the microscopic changes in the udder and testis are inconclusive in establishing the precise identity of the infection.

The present study deals with nocardiosis of the udder and testis. Although one cannot rule out that the infection may take place through wounds or abrasions, or through the teat in case of the udder, it is noted that in most of the cases examined there were also lesions in other organs, which might indicate that the infection may be the result of generalised nocardiosis. Although no human case has been proved to derive its infection from animal sources, yet as long as the epidemiology is cloaked in obscurity, the possibility of acquiring infection from milk cannot be ignored. Moreover, the resultant economic loss in productivity is too obvious to be overlooked.

Acknowledgments.—The writer wishes to thank Dr. I. M. Khalil, Director, Ministry of Animal Resources, for permission to publish this work and Dr. A. A. Karib, Assistant Director for Research, for his encouragements and criticism of the work. He is indebted to Dr. M. Fahmy, Senior Meat Inspector, Central Abattoir, and to Taher Eff. for preparing the media and other technical assistance.

References

AWAD, F. I. (1958). *J. comp. Path.* **68.** 324.
———, & KARIB, A. A. (1958). *Zbl. Vet. Med.* **5.** 265.
JENSEN, K. A. (1953). F.A.O. Agriculture Studies No. 25, p. 35.
M'FADYEAN, J. (1917). *J. comp. Path.* **30.** 139.

£100,000 FOR RESEARCH INTO ANIMAL HEALTH

The Nuffield Foundation has made a grant of £100,000 to the Zoological Society of London to found an institute of comparative medicine and to provide two senior research fellowships.

The society already has a modern hospital and the new institute will provide a much-needed opportunity to increase knowledge of disease in animals and to maintain the health of the society's collections.

A committee of medical and veterinary specialists, under the chairmanship of Sir Roy Cameron, with a planning group under the chairmanship of Professor G. Tayling-Wright, has been appointed to advise the council.

Controlled Tests with Four New Anthelmintic Substances Against *Trichostrongylus axei* in Sheep

BY

T. E. GIBSON

Central Veterinary Laboratory, Weybridge

SUMMARY.—Controlled tests have been carried out with 2 bephenium compounds and 2 organic phosphorus compounds against T. axei *in sheep. Bephenium embonate, given at a dose rate of 250 mg. per kg. of bodyweight, was 56 per cent. efficient, and at the same dose rate bephenium hydroxynaphthoate was 74 per cent. efficient. The organic phosphorus compounds "Trolene" and "Neguvon" were both without effect against* T. axei. *The former was given at a dose rate of 110 mg. per kg. of bodyweight and the latter at the rate of 100 mg. per kg. of bodyweight.*

ALTHOUGH controlled tests (Gibson, 1949) have demonstrated the high efficiency of phenothiazine for the removal of *T. axei* from sheep, the rather bulky dose and the staining of the wool by oxidation products of the drug passed in the urine are undesirable features. A search for alternative medicaments is, therefore justified and 4 of the newer anthelmintic compounds have been evaluated as anthelmintics against *T. axei* in sheep. The compounds tested were 2 of the bephenium series, bephenium embonate and bephenium hydroxynaphthoate, and 2 of the organic phosphorus compounds namely 0,0-dimethyl-0-2,4,5,-trichlorophenyl phosphorothiote (Trolene, Dow E.T.-57) and 0,0-dimethyl 2, 2, 2 - trichloro - 1 - hydroxymethyl phosphonate (Neguvon, Bayer L13/59).

Materials and Methods

The controlled test, Moskey and Harwood (1941), was used in these experiments which were carried out in 3 parts. The sheep used were reared under conditions which kept them free from gastro-intestinal nematodes, but only in the second experiment, were the lambs completely worm-free at the beginning of the experiment. The lambs used in the first and third experiments had previously been used in investigations on nematodiriasis but had thrown off their infestations of *Nematodirus* spp. before the present series of tests began.

In the first experiment 6 lambs, approximately 4½ months old, were infected with *T. axei* by the oral administration of 6,000 infective larvae to each lamb on each of 10 successive days. Seventeen days following the last inoculum of larvae half the lambs were treated with bephenium embonate at a dose rate of 250 mg. per kg. of bodyweight; the drug being suspended in water and administered by means of a drenching gun. Four days after the administration of the drug the lambs were killed for *post-mortem* examination, when the abomasum, small intestine, and large intestine were removed and the number of worms in each viscus estimated by the usual dilution technique.

Eight 2-month-old worm-free lambs were used in the second experiment and were infected with *T. axei* by the administration of 6,000 infective larvae on each of 5 successive days. Four weeks following the last inoculum of larvae 5 of the 8 animals were treated with Trolene at the rate of 110 mg. per kg. of bodyweight; the drug being administered in gelatine capsules by means of a balling gun. A week after the administration of the Trolene the treated animals and those of the control group were slaughtered for *post-mortem* examination, and again the abomasum, small intestine and large intestine were removed from each lamb and the worm burden of each organ was estimated by the usual dilution technique.

Twelve 14-month-old sheep were used in the third experiment and were infected with *T. axei* by the administration of 10,000 infective larvae of *T. axei* to each lamb on each of 12 successive days. Four weeks after the administration of the last inoculum of larvae the sheep were divided into 3 groups of 4. The first group was treated with Neguvon administered as a suspension by means of a drenching gun at a dose rate of 100 mg. per kg. of bodyweight. The second group received bephenium hydroxynaphthoate at a dose rate of 250 mg. per kg. of bodyweight, administered as a suspension by means of a drenching gun. The animals of group 3 were kept as untreated controls. Four days after treatment all the animals were killed and at *post-mortem* examination the abomasum, small intestine and large intestine were removed and the number of worms present in each organ was estimated as before.

Results

The results of the experiments are summarised in Tables I to III. The percentage efficiencies recorded in each table are calculated from the corresponding group totals and are not intended as an exact assessment of the comparative efficiency of the 4 drugs. They do, however, indicate their approximate relative efficiency.

TABLE I
THE EFFECT OF BEPHENIUM EMBONATE ON *T. axei* IN LAMBS

Lamb No.	Drug administered	No. of *T. axei* present at P.M. examination	Group Total	Percentage efficiency
528	Bephenium	10,750		
537	embonate	14,900	38,450	56
538	250 mg. per kg.	12,800		
524	Untreated	25,900		
540	controls	30,300	88,200	
586		32,000		

TABLE II
THE EFFECT OF TROLENE ON *T. axei* IN LAMBS

Lamb No.	Drug administered	No. of *T. axei* present at P.M. examination	Group Total	Percentage efficiency
632		19,700		
633	Trolene	18,100		
638	110 mg. per kg.	17,950	94,100	0
640		17,200		
643		21,150		
634	Untreated	20,150		
642	controls	17,600	55,000	
644		17,250		

TABLE III
THE EFFECT OF BEPHENIUM HYDROXYNAPHTHOATE AND NEGUVON AGAINST *T. axei* IN SHEEP

Lamb No.	Drug administered	No. of *T. axei* present at P.M. examination	Group Total	Percentage efficiency
604		5,300		
605	Bephenium	10,650		
611	hydroxynaph-			
	thoate	12,500	50,600	74
699	250 mg. per kg.	22,150		
610		54,000		
651	Neguvon	59,300	227,650	0
654	100 mg. per kg.	60,000		
700		54,350		
603		33,050		
606		49,800	191,500	
609		55,100		
612		53,550		

Discussion

Although bephenium embonate has been shown to have considerable activity against *Nematodirus* spp. in sheep, Rawes and Scarnell (1958) and Gibson (1959), its activity against other species has been inadequately tested. Rawes and Scarnell (1959) report an average efficiency of 77 per cent. (range 47 to 100 per cent.) against *T. axei* but state that the results are not statistically significant. A slightly lower average of 56 per cent. was recorded in the present work. With bephenium hydroxynaphthoate, however, Rawes and Scarnell (1959) report that statistically significant results were obtained revealing an average efficiency of 93 per cent. with a range of 88 to 99 per cent. The results obtained in the present investigation were not quite so spectacular; an average efficiency of 74 per cent. being obtained with a range of 52 to 88 per cent.

Gordon (1958a) investigating the use of Trolene in sheep found it to be quite ineffective against all trichostrongylid worms, a conclusion supported by Schad *et al.* (1958). In cattle also, Herlich and Johnson (1957) found Trolene to be ineffective against *T. axei* in critical tests. Neguvon was found by Gordon (1958b) to be effective against *Trichostrongylus* spp. in sheep only if the drug passed directly into the abomasum. There appears therefore, to be general agreement that both Trolene and Neguvon are ineffective against *T. axei* in sheep.

None of the compounds tested in the present series of experiments was as efficient against *T. axei* in sheep as phenothiazine (Gibson, 1949). When the bephenium compounds are used in the control of nematodiriasis it is clear that bephenium hydroxynaphthoate is preferable to the embonate since it has superior activity against trichostrongylid worms other than *Nematodirus* spp.

References

GIBSON, T. E. (1949). *Brit. vet. J.* **105.** 309.
———. (1959). *Vet. Rec.* **71.** 431.
GORDON, H. McL. (1958a). *Aust. vet. J.* **34.** 374.
———. (1958b). *Ibid.* **34.** 104.
HERLICH, H., & JOHNSON, J. M. (1957). *J. Parasitol.* **43.** suppl. 19.
MOSKEY, M. E., & HARWOOD, P. D. (1941). *Amer. J. Vet. Res.* **2.** 55.
RAWES, D. A., & SCARNELL, J. (1958). *Vet. Rec.* **70.** 251.
———, ———. (1959). *Ibid.* **71.** 645.
SCHAD, G. A., ALLEN, R. W., & SAMSON, K.S. (1958). *Vet. Med.* **53.** 533.

HOLIDAY EXCHANGES

There are a number of opportunities for the sons and daughters of veterinary surgeons in this country to visit their colleagues on the Continent during the forthcoming holiday periods, and we should be glad to hear from members of the profession who are interested in this scheme.

France—Exchange Holidays

M. Brana (aged 16½) of Gers would like to entertain a colleague in his own country town for about 3 weeks and to arrange an exchange with him during the period July 15th to September 15th to visit England.

M. Chaigneau (aged 15) of Montaigu (Vendée) would like to come to England during July and entertain his host to a sea-side holiday in France in August this year.

Mlle. Denise of Blanzac (Charente) would also like to visit England on an exchange scheme.

Mlle. Martine Laine (aged 15) of Angers would like to arrange a holiday exchange to cover the period July and August this year. She would like to stay in a household where there are a number of children.

Mlle. Lesauvage (aged 17) is anxious to come to England on an exchange basis for one month, and suggests that she should visit England during July and return with her host to France for the whole of August.

Gaillon (Eure). Girl, 15½ years, whose parents are both veterinary surgeons, wishes to stay in England for 3 weeks in August, and would offer the following 3 weeks of hospitality in France in return.

Paying Guests

We also have several requests from French veterinary families for accommodation for their children as paying guests with veterinary families in this country.

The Veterinary Profession and the Poultry Industry

It is thought that readers will be interested in the following article, written by three specialists within the profession. It was issued to the press recently, and widely reported.

It is opportune for the British Veterinary Association to comment on the development of the poultry industry over the last 10 years in this country, as it can be fairly said that one phase of expansion has been completed and another has just begun.

The rapid development of intensive poultry keeping in its many specialised fields is a credit to those far-sighted pioneers who evolved the methods of management, and the efficient buildings, equipment, and feeding-stuffs on which the modern industry is based.

The health of the poultry of this country is the concern of the veterinary profession, and through the agency of the whole-time veterinary staff of the Animal Health Division of the Ministry of Agriculture, the health of a large proportion of the breeding stock of fowls, turkeys, and ducks, has been carefully safeguarded. In the past 20 years the expansion which has taken place was possible because the basic poultry breeding stock of the country was comparatively healthy and free from disease.

It is with the knowledge and experience of the growth of the poultry industry that the B.V.A. offers in general terms its comments on some facets of disease control, examining critically current practices in the industry, and stressing the increasing responsibility of the industry to itself if serious economic loss is to be avoided in the future.

General management and hygiene, as practised 10 years ago and found satisfactory when flocks numbered a few hundred birds each, are inadequate to-day under intensive management with the average flock amounting to thousands of birds. The density of poultry throughout the country is now very great and there can be few districts without broiler units or intensively housed flocks.

The number of birds, animals, or human beings in a particular environment is an important factor in controlling disease. Severe losses from disease are much more likely in large populations than among small isolated groups.

It is unfortunate that many diseases of major importance are caused by viruses, for as yet there are no drugs or antibiotics which can be relied upon to check these disease-producing agents. Examples of virus diseases against which there is no cure are avian leucosis in its many forms, infectious laryngotracheitis, fowl pest, epidemic tremor, and infectious bronchitis.

Frequent movements of stock of different ages are an inevitable feature of the poultry industry and it is this factor which so increases the risk of widespread dissemination of infectious disease as compared with other livestock.

Even the limited 10-week life of a batch of broilers illustrates this point. Losses may occur from egg-transmitted disease or from infection contracted in the first few hours of life at the hatchery. The commonest diseases of this type are pullorum disease, fowl typhoid, and the other Salmonella infections; some forms of leucosis, infectious synovitis, and epidemic tremor are also probably egg transmitted.

Although drugs are available against some of these diseases, routine blood testing of breeding stock under veterinary supervision is still essential if losses from pullorum disease and typhoid are to be prevented.

As soon as chicks arrive at a production unit they are exposed to risk of infection from many sources. They may be visited and inspected by other poultry keepers, employees who keep poultry, builders and electricians, equipment specialists, feeding-stuff representatives, packing station fieldsmen, hatchery representatives, etc.; finally there are the employees of the poultry packing station collecting the batch for killing. All these people are potential carriers of disease who may introduce infection on their hands, shoes, or clothing, or on their crates, tools, and equipment.

The very nature of their work exposes them to infectious diseases which can be carried unwittingly from one producer to another or from one unit on a farm to another on the same farm.

Adult birds are the main reservoir of infection in several diseases, and it is a mistake to keep different age groups on the same premises as infection will often build up in successive batches, slowly reducing profitability without actual disease being suspected; occasionally, however, a sudden flare up of infection may cause heavy loss.

It is obvious that everything possible must be done to prevent the casual introduction of infection to a poultry plant as only at this point can effective prevention operate. The responsibility is two-fold. Firstly, the owner of an intensive unit or any large flock of birds must isolate them so far as possible and sever links with all other poultry. Employees must not be allowed to keep stock or live where other poultry are kept. All essential visitors who have to go among the stock must wear protective clothing or overalls and rubber boots before they have contact with the stock. It is a small expense relative to the capital at risk to purchase a few pairs of rubber boots and overalls for use *on the farm* by employees and visitors unless, of course, the latter come already supplied with suitable clothing.

Secondly, the many individuals whose job it is to visit poultry farms must realise that they may carry infection unless they wear protective clothing and maintain a high standard of personal disinfection of both clothing and other equipment. The poultry keeper has a right to expect that these people do not bring disease to his birds.

A major contribution in disease control and prevention must therefore come from the poultry industry itself and in this every poultry keeper has a part to play. Every person and everything having contact with his stock must be cleared as though from a security point of view.

Fowl Pest

Although fowl pest is only one of the more spectacular and serious of the diseases of poultry, the measures taken by owners to prevent its introduction into their flocks will thereby safeguard them from many of the other infectious diseases.

Over the last few months lack of appreciation for flock security has led to introduction of fowl pest into some of the largest poultry units in the country as a result of infection on the hands and clothes of owners from other flocks they had visited, by employees whose own birds had become infected, by casual callers, and from dirty crates, and possibly litter sacks. A little care and thought would have prevented many such outbreaks.

In the early stages of the average outbreak of fowl pest, an owner usually senses something wrong with a group of birds when only a few individuals are visibly affected. But in large intensive units, these early signs are difficult to discern before disease is widespread and in consequence there is a much greater risk of disseminating infection. Millions of virus particles may become airborne passing out *via* extractor fans and ventilation shafts thus constituting a serious hazard to poultry over a wide area. The modern poultry keeper has a double responsibility, first to protect his own flock, and then to ensure that by carelessness or lack of thought he does not expose his neighbour's birds to infection.

Expert veterinary advice is readily available to all sections of the industry and professional help should be sought whenever problems arise. The fullest use should be made of veterinary laboratories and specimens should be taken or sent to these laboratories for expert examination and diagnosis whenever undue mortality occurs.

Hatchery owners, in particular, have a major part to play in the supply of healthy chicks and their managers should consult with their veterinary advisors on all aspects of disease control, from the handling and collection of the hatching eggs to the disposal of incubator waste and dead-in-shell chicks.

The managers of poultry packing plants should remember that at any time they are liable to be handling birds in the early stages of an infectious disease which by one or other of the means already mentioned may be carried to many other producers before the danger is realised.

Similarly, at egg-packing stations basic routine must be examined to ensure that infection is not carried on egg boxes and trays from one supplier to others served by the same station. Facilities for the fumigation of egg boxes should be available for use should a supply farm come under suspicion.

These precautions, when practised as a routine at hatcheries and packing stations, will in time surely be noted by the individual poultry owners until their general application follows. Poultry keepers will then themselves demand the protection of their interests in this manner from those serving them.

Many advances have been made in the treatment of bacterial and parasitic diseases and great benefit has been obtained from the new drugs available to-day for treatment of poultry disease. But these drugs can be expensive and often quite worthless unless used correctly following an accurate diagnosis as to the cause of the disease. Diagnosis and treatment of disease is the job of the veterinarian backed by the resources of the laboratories, without whose help the recognition of many important diseases is impossible.

Every poultry keeper must, in the interests of the industry of which he is part, realise his responsibilities and play his part in controlling disease. The British Veterinary Association takes this opportunity of wishing the poultry industry every success in the future and expresses the hope that even closer links will be forged between the industry and the veterinary profession.

The Annual Conference of the A.V.T. & R.W.

The Annual Conference of the Association of Veterinary Teachers and Research Workers was held in Bristol on March 29th, 30th, and 31st, 1960, at Wills Hall, an undergraduate residence of Bristol University. It was a happy coincidence that Professor Ottaway should be the President of the Conference on the occasion of its visit to Bristol. One hundred and eighty delegates attended the Conference of whom 134 were in residence. Despite the rather low ambient temperatures a highly successful conference took place. Three simultaneous scientific meetings took place throughout the conference in different rooms in the Wills Hall, thus making it possible for those attending papers to switch from room to room between each individual paper. As there were some 70 papers presented at the meeting a wide selection was available to meet the interests of all present. The standard of papers presented, each lasting for only 15 minutes, was exceedingly high and papers were often followed by short but stimulating discussions.

From the experience of this conference it would appear that the concept of a 15-minute paper being followed by a 10-minute discussion period and that in turn being followed by a 5-minute interval, works very successfully for this type of audience and it is likely that this will continue to be the framework of successive conferences. As far as was possible papers were grouped together under specialist interests in order to cut down the amount of changing from room to room.

No formal social functions were held, which appeared to stimulate the formation of numerous small parties which continued in one case at least until the dawn chorus.

After the conference finished on Thursday a party of 40 delegates proceeded to the Field Station of the Veterinary School at Langford where they were received by Professors Messervy and Grunsell. In addition to visiting the buildings and examining various static demonstrations visitors were able to watch a series of operations being performed by

Professor Messervy and his staff in their excellent and efficient operating theatre.

At the Annual General Meeting a lively discussion on several topics took place. Professor Weipers was elected President of the Association for the ensuing 2 years and Dr. J. O. L. King became the Vice-President. The following is a complete list of office bearers:—

President: Professor W. L. Weipers; *Vice-President:* Dr. J. O. L. King; *Hon. Secretary:* Dr. W. I. M. McIntyre; *Hon. Treasurer:* Mr. I. M. Lauder.

Representing Southern Region: Professor H. Burrow (Council member Southern Region) and Mr. E. F. Lewis (Secretary Southern Region).

Representing Northern Region: Mr. A. G. Singleton (President Northern Region) and Dr. F. T. W. Jordan (Secretary Northern Region).

Representing Scottish Region: Dr. J. T. Stamp (President Scottish Region) and Dr. W. F. H. Jarrett (Secretary Scottish Region).

It was decided at the Annual General Meeting that the air of informality of presentation of papers should be maintained and that formal publication of the papers other than the summaries precirculated to members should not take place. However, for general interest of members of the profession a full list of titles and authors is given below. It is thought that this will let other members of our profession see who is working on what subjects and thus provide some useful information.

"Low Intestinal Obstruction in Piglets," J. B. M. Gellatly, Edinburgh.

"Neonatal Anasarca in Relation to Piglet Mortality," B. L. Edwards, Ministry of Agriculture, Worcester.

Film—"The Baby Pig as an Experimental Animal," D. E. Kidder, M. J. Manners, and M. R. McCrea, Bristol.

"Functional Disturbances in Pneumonic Cattle," E. W. Fisher, Glasgow.

Film—"Moving Boundary Electrophoresis," A. E. Pierce, Babraham.

"Experiments with Radioactive Steroid Hormones in Domestic Animals," R. V. Short, Cambridge.

"Toxoplasmosis and Ovine Abortion," W. A. Watson, M.A.F.F., Leeds.

Film—"Pregnancy Toxaemia (Twin Lamb Disease)," J. C. Buxton, Loughborough.

"The Radiotoxicity of Iodine-131 to Cattle," R. J. Garner, Compton.

"Goitrogenic Factors in Kale," Dr. Ruth Allcroft, Weybridge.

"The Fate of Magnesium in the Sheep Demonstrated by the Use of Mg^{28}," A. D. Care, Lilystone Hall.

"The Surgery of the Equine Cryptorchid," G. H. Arthur, London.

"Side-effects of Muscle Relaxants," D. E. Stevenson, Cambridge.

"The Effect of Succinyl Choline Chloride on the Heart of the Horse. Clinical and Pathological Aspects," W. D. Tavernor, London.

"Avian Osteopetrosis," J. R. Holmes, Bristol.

"Observations on the Histopathology of Intestinal Coccidiosis; the Relative Importance of Schizogony and Gametogony," S. F. M. Davies, Weybridge.

"The Immunising Value of Adjuvant Vaccines Prepared from *Br. abortus* Strain 45/20," A. McDiarmid, Compton.

"Experiences in Non-infected and Infected *Br. abortus* S.19 Vaccinated Herds," D. J. MacKinnon, Weybridge.

"Primary Infection of the Bovine Udder with *Br. abortus*," W. J. Brinley Morgan, Weybridge.

"Johne's Disease: Experimental Non-sensitising Vaccines," R. L. Chandler, Compton.

"The Viable Count of *M. johnei* in the Intestinal Mucous Membrane of Sheep," N. J. L. Gilmour, J. G. Brotherston, and I. M. Samuel, Moredun.

"The Pathogenicity of *M. johnei* for Sheep Following Parenteral and Oral Infection," J. G. Brotherston, N. J. L. Gilmour, and I. M. Samuel, Moredun.

"Observations on Calcium Metabolism in the Parturient Bovine," E. W. Moodie, Edinburgh.

"Observations on the Effects of Calcium and Phosphorus Deficiency on Bone Growth in Dogs," J. R. Campbell, Glasgow.

"A Sheep Health and Improvement Scheme as a Technique of Preventive Medicine: Some Results of the First Seven Years," H. B. Parry, Nuffield Institute, Oxford.

"The Excretion of Some Sulphonamides by the Fowl," A. H. Sykes, Liverpool.

"Some Observations on the Use of Framycetin," J. Stratton, London.

"The Concentration of Some Antibiotics in the Milk after Intramammary Infusion," Miss O. Uvarov, Glaxo.

"Artificial Insemination in Relation to Oestrus in the Sow," P. Radford, Bristol.

"Spermatozoa in the Epididymis (An Experimental Study)," T. D. Glover, Liverpool.

"The Use of Calcium Disodium Complex of Ethylenediamine Tetra-acetic Acid (Ca.E.D.T.A.) in the Treatment of Lead Poisoning in Calves. The Effect on Storage and Excretion of Lead," Miss G. Lewis, Weybridge.

"A Necrotic Inflammation of the Crop in Budgerigars," J. E. Beach, London.

"The Measurement of Glomerular Filtration Rate in the Dairy Cow," R. S. Anderson and E. C. Pickering, Glasgow.

"Water Diuresis in the Adult Cow," R. G. Dalton, Glasgow.

"Some Observations on Dental Development in the Dog," L. Arnall, Liverpool.

"Experiments with *Ostertagia ostertagi* in Calves," J. F. Michel, Weybridge.

"Studies on the Histotrophic Stages of *Haemonchus contortus*," P. H. Silverman, R. J. Terry, and D. Poynter, Allen & Hanburys, Ware.

"Serological Aspects of Lungworm Infection in Cattle," R. L. Cornwell, Liverpool.

"The Effects of Various Factors (Strain, Age, etc.) on the Assay of the Virus of Foot-and-Mouth Disease in Unweaned Mice," H. Subak-Sharpe, Pirbright.

"Hypervitaminosis D in Adult Cattle," A. Greig, Glasgow.

"The Metabolism of Mice: an Experiment in Pre-clinical Teaching," A. E. Hawkins, London.

"Objective Recording of the Heart Beat as an Aid to Clinical Teaching and Research," M. C. G. Littlewort, Cambridge.

"Further Studies on Tick-borne Fever," A. Foggie, Moredun.

..."*Pasteurella haemolytica*: Studies on Pathogenicity in Sheep," G. R. Smith, Moredun.

"The Occurrence of Antitoxin in Milk Whey in Experimental Staphylococcal Mastitis in Vaccinated and Non-vaccinated Cows," J. B. Derbyshire, Compton.

"The Effect of Antiserum on the Growth of *Cl. welchii* type A," J. J. Bullen, Rowett.

"Arthritis in Cattle," L. C. Vaughan, London.

"Sexual Behaviour in Cattle," S. Jennings, Glasgow.

"The Pathology of Bovine Parasitic Bronchitis in the Susceptible, Immune, and Vaccinated Animal," W. F. H. Jarrett and N. C. C. Sharp, Glasgow.

"Some Clinical Observations in Calves on the Effects of Administration of Normal and X-Irradiated Infective *D. viviparus* Larvae," A. M. R. Nelson, B. V. Jones, and R. Peacock, Allen & Hanburys, Ware.

"Some Studies on the Biology of *D. viviparus*," D. Poynter, R. J. Terry, and P. H. Silverman, Allen & Hanburys, Ware.

Film—"Perineal Rupture in the Dog," R. G. Walker, Cambridge.

"Intertarsal Subluxation in the Dog," D. D. Lawson, Glasgow.

"Chronic Respiratory Disease in Dogs," L. W. Hall, Cambridge.

(*Concluded at foot of col.* 1 *overleaf*)

News and Comment

SUPPLIES OF MALLEIN

As from May 1st, 1960, the production and supply of mallein by the Department of Medicine, Royal Veterinary College, will be discontinued. On and after that date mallein will be obtainable by veterinary surgeons from the Central Veterinary Laboratory, Ministry of Agriculture, Fisheries and Food, New Haw, Weybridge, Surrey. The charges will be 3s. per c.c. of concentrated mallein and 2s. 6d. per 5 c.c. of diluted mallein. Requests for supplies should be addressed to the Secretary, Weybridge Laboratory, as above.

R.C.V.S. DAY LUNCHEON

Readers are reminded that applications for tickets for all the ceremonies of the College on May 25th, should be made as soon as possible to the Registrar, 9, Red Lion Square, London, W.C.1. The Service in the Queen's Chapel of the Savoy will be followed by the Luncheon at the Savoy Hotel at which the Minister of Agriculture, Fisheries and Food is the principal guest and speaker. There will be tea at the College in the afternoon following the Annual General Meeting.

The Annual Conference of the A.V.T. & R.W.—*Concluded.*

"Diagnosis of Canine Distemper by Tissue Culture Methods," J. T. Vantsis, C. Botcherby, M. Taylor, and Mrs. Myrtle Pirie, Glasgow.

"Experimental Transmission of Inclusion Body Rhinitis of Swine," J. T. Done, Weybridge.

"The Significance of Nuclear Aberrations in Cultures of Normal Cells from Different Animal Species," N. M. Larin, Pfizer.

"The Use of the Sex Chromosomes of the Domestic Chicken as Cell Markers," L. N. Payne, Bristol, and P. M. Piggs, Houghton.

"A Hypothesis on the Mechanism of Production of Eosinophilia and Eosinopenia," R. K. Archer, Newmarket.

"The Use of Field Surveys in the Study of Diseases of Farm Animals," F. B. Leech, Harpenden.

"Field Extension Services and the Veterinary Surgeon," G. C. Brander, Wellcome, Frant.

"The Presentation of Papers at Scientific Meetings," E. L. Taylor, Weybridge.

"A New Approach to the Demonstration of *Cl. welchii* Toxins in Intestinal Contents," G. H. Bennett, M.A.F.F., Redhill.

"The Isolation and Identification of Clostridia Commonly Found in Pathological Material," Miss M. E. Brooks, Wellcome Laboratories.

"Some Aspects of Carbohydrate Metabolism in the Treatment of Bovine Ketosis," K. N. Burns, Weybridge.

"Biochemical Studies on Bovine Acetonaemia," S. J. Bach and K. G. Hibbitt, Bristol.

"Enzyme Changes in Liver Diseases," E. J. H. Ford and J. W. Boyd, Babraham.

"The Pathogenesis of Johne's Disease," J. M. Payne, Compton.

"The Bacteriophage Typing of Bovine Staphylococci," I. Davidson, Weybridge.

"Studies on the Relative Values of Serological and Allergic Tests in the Diagnosis of *M. johnei* Infection in Cattle," J. K. L. Pearson, Stormont.

THE BRITISH UNITED PROVIDENT ASSOCIATION

Following on our announcement in the March 5th issue of THE VETERINARY RECORD (p. 186), a sufficient number of members has been enrolled to start a B.V.A. group within the above scheme for hospital benefits, and those members who have applied already will shortly be receiving banker's order forms to provide for the quarterly payment of their subscriptions.

Any member who has not already applied can join this Group and is invited to write for details from the Accountant, B.V.A., 7, Mansfield Street, London, W.1. The advantages of B.U.P.A. membership are so considerable that the scheme can be confidently recommended to all veterinary surgeons who are not already fully covered by other forms of sickness insurance and benefit.

B.V.A. CAR BADGE

Arrangements have now been made for the supply of car badges to members in the near future. It will be recalled that such badges were sanctioned by the Council some little time ago.

With a view to ensuring strict control of the issues of badges members are, in the first instance, invited to apply for an application form, enclosing an addressed envelope.

The design of the car badge is based on the Association's crest, with the name of the B.V.A. in the surround. It will be of 2 types only: one for fixing to bumpers and the other to radiator grilles. It is regretted that a suitable form for badge bars will not be available, but it is understood that most garages could adapt the bumper type. Fuller details are given in the application forms.

CATALOGUE OF VETERINARY FILMS

We are advised that all orders for the catalogue should be sent to the Secretariat of the W.V.A., 168, Biltstraat, Utrecht, Holland, at the same time as a remittance of D.fl.5 or its equivalent is made *to the W.V.A.'s bankers*, Nederlandsche Handel-Mij. N.V., Utrecht, for the account of the Permanent Committee of the W.V.A. Only after remittance has been received can the catalogues be sent.

INTERNATIONAL MEETING OF NUTRITIONISTS

The second International Meeting of Animal Nutritionists will be held in the Costa Brava (Spain) from September 12th to 17th, 1960.

British workers are invited to participate, and those wishing to do so should write to Dr. J. Amich-Gali, P.O. Box 466, Barcelona, Spain, asking for details and full programme.

THE COLONIAL VETERINARY SERVICE

Promotion. E. M. McWatt, D.V.M. (ONT.), Veterinary Officer, British Guiana, becomes Assistant Director of Agriculture (Veterinary and Animal Husbandry), British Guiana.

THE REGISTER OF VETERINARY SURGEONS

The following ladies and gentlemen were admitted to membership in virtue of the registrable degree of B.Vet.Med. of the University of London on April 7th, 1960:—

Clemenger, John Frederick Parsons, 27F, Green Bank, Brockworth, Gloucester; Cleverly, John Malcolm, 60, Cumberland House, Kingston Hill, Kingston upon Thames, Surrey; DeVile, Christopher Paul, St. Peter's Vicarage, Langham Gardens, Grange Park, London, N.21; Entwisle, John Malcolm, 116, Monkhill Lane, Pontefract, Yorks.; Green, Roger, 124, Elm Walk, London, S.W.20; Hazzard, Terence Cuthbert, 80, Stansted Road, Bishops Stortford, Herts.; Kirwan, Ethel Ann (Miss), 171, Queens Road, Wimbledon, London, S.W.19; Lane, Peter James, The Heddles, Mizen Way, Cobham, Surrey; Lepper, Anthony Walter David, 55, Hayes Road, Bromley, Kent; Lorenzen, Charles Christopher Martin; 77, Hill Crest Road, Thorpe, Norwich; Lorenzen, Patricia Jean (Mrs.), 77. Hill Crest Road, Thorpe, Norwich; Luckhurst, John, 99, Rock Road, Sittingbourne, Kent; Pabs-Garnon, Leonard Fredrick, 15, Blackhall Road, Waterloo, Sierra Leone, West Africa; Poulter, David Arthur Leslie, 62, Station Road, King's Langley, Herts.; Sheridan, John Phillip, Oaktree Cottage, 40B, Southend Road, Beckenham, Kent; Shields, Rodney Aldred Somerset, Crossways, Wroxham, Norwich, Norfolk; Smith, John Stroyan, 33, Weston Drive, Stanmore, Middx.; Stock, John Edward, Shorts Farm, High Easter, Chelmsford, Essex; Stockley, Rachel Elizabeth (Miss), Manor Farm, Chipping Warden, nr. Banbury, Oxon; and Thompson, Filmer George Auger, Taylors Hill, Chilham, Canterbury, Kent.

Mr. Spencer Norman Bayer, B.V.SC. (Pretoria) was registered in the Commonwealth List of the Register on April 25th, 1960. His address for the present will be c/o South Africa House, Trafalgar Square, London, S.W.1.

FIFTY NATIONS DISCUSS VETERINARY EDUCATION

At the invitation of the Government veterinary representatives of more than fifty member nations of FAO met in Church House, Westminster, last Monday morning for a week's discussion on Veterinary Education. The principal organiser of the Conference was Sir Thomas Dalling, Senior Veterinary Consultant to FAO, and he was assisted by the President and the Registrar of the Royal College of Veterinary Surgeons together with a representative of the Ministry of Agriculture.

The Conference was opened officially by Lord Waldegrave, Joint Parliamentary Secretary to the Ministry of Agriculture, who emphasised the essential part played by veterinary surgeons all over the world in helping to increase animal productivity and thus add to the available quantities of food for human consumption. He spoke of the great advances in veterinary research during recent years, but pointed out that the value of such work depended upon an adequate number of properly trained veterinarians who could put into practice the discoveries made in the laboratory. Lord Waldegrave referred briefly to those diseases communicated by animals to man and dwelt upon the public health importance of overcoming them.

Among the delegates were representatives of all the British veterinary schools and principal research institutes. The representatives of the British Veterinary Association were the President, the junior vice-President, and the Hon. Treasurer.

Lord Waldegrave's speech of welcome was followed by one from Dr. K. V. L. Kesteven, Director of the Animal Production and Health Division at FAO. He said that the member governments of his organisation had become increasingly concerned with the problems of animal health and productivity particularly in the less-advanced countries, and it was essential not only to train many more veterinary surgeons but to provide specialised education to fit them adequately to deal with problems peculiar to the regions in which they would work. In addition there had to be considered the education and training of lay-assistants or auxiliaries, having regard to the fact that it would be many years, if ever, before some of the Asian and African countries had a sufficient number of qualified veterinary surgeons. This matter had received already considerable attention from FAO, who had sponsored expert surveys in the Far East in 1955 and in the Near East in 1956. Dr. Kesteven said that FAO hoped to inaugurate in the near future a "freedon from hunger campaign." Veterinary surgeons by their work could do much to ensure its success.

At this week's Conference it was intended only to cover the subject of veterinary education in broad general terms. More detailed considerations would be left to a group or panel which the Conference might establish.

The following were the subjects discussed. Papers were read by leading veterinary surgeons and teachers from all over the world, and discussions followed:—

Education and Training of Veterinarians to Meet the Regional Requirements of Veterinary Services.

Education and Specialised Training of Veterinarians in Different Subjects: Undergraduate and Post-graduate.

Education and Training of Lay Staff for Veterinary Duties.

Establishment of an International Panel to Consider and Report on Veterinary Education in Detail, Special Note being taken of any Recommendations made at this Meeting.

After the Conference study tours were arranged under the aegis of the British Council in co-operation with the Ministry of Agriculture and the Royal College of Veterinary Surgeons.

It is hoped to publish a further account of the week's proceedings in our next issue.

UNIVERSITY NEWS

London

Veterinary Pre-clinical Examination: Part II

The following is the Pass List:—

Anderson, Peter Henry; Bailey, Paul Patrick; Baldry, Alan Frederick; Barfoot, David William; Baron, James Hartley; Crooks, Arthur; Dunkley, Michael John William; Goode, Gillian Rachel; Grandage, John; Green, David Russell; Hatherill, Charles Wythan Baxter; Hazell, John Lancaster; Hilbery, Anthony David Rowland; Kirk, Elizabeth Helen; Lawler, David Craig; Lewis, Christopher James; Martin, Roger Courtney; Mathewson, Michael John; Peters, Frederick William; Phillippo, Michael;

Smith, John Richard; Smith, Simon Eric Gilbert; Sopp, Robin David; Symonds, Herbert William; Thompson, Brian John; and Towlerton, Richard George.

MR. FRANK BRADLEY

W. B. Q. writes:—

The passing of Frank Bradley will mark the end of an era of service to the farming community around Kingston upon Hull. He was admired for his careful judgment and the absolute honesty of his character, and because of this the opinions he gave to his professional colleagues and his clients commanded respect of a very high order.

He left his practice during the First World War to serve with distinction as a Captain in the East Riding Yeomanry. He returned to find he had to start almost from the beginning again, but he was a keen horseman and quickly gained a name for himself as a reliable and competent judge of horseflesh. He hunted regularly with the Holderness and kept his own horses.

Arriving unknown in the district 20 years ago the writer has cause to be grateful for Frank Bradley's kindness and generosity; his dry humour always made professional worries seem less serious and his advice and freely given help were always there for the asking.

He is survived by his wife and only son, who is a farmer.

MR. S. B. LITTLER

Mr. S. V. Collard writes:—

Barry Littler, veterinary officer at Leamington Spa for the last 3 years, will be missed greatly by his colleagues. He died on April 9th after a very short illness. He came here from Harrogate, West Riding, where he had worked for about 17 years. He was a quiet and unassuming man, very genuine, and much liked by all with whom he came into contact.

Barry had a good veterinary background. Both his father and grandfather practised in Newark, Notts.

We buried Barry at Kenilworth on Wednesday, April 13th, and relations, friends, and members of the profession attended his funeral. They included Mr. S. Littler, his father, Messrs. D. B. Davies, A. Hogg, D. Croft, H. Duff, D. Cochrane, S. V. Collard, W. Scott, John McGhee, Trevor Morgan, G. Brook, J. J. King, and K. Howell representing the office staff.

Our sympathies go out to his wife and daughter in their great loss and their sorrow.

R.C.V.S. OBITUARY

We record with regret the death of the following member of the profession:—

BRADLEY. Frank, Reka Dom, Hessle, East Yorks., Capt. R.A.V.C. T.F. (Re'd.). Graduated May 19th, 1909, at the Royal (Dick) Veterinary College, Edinburgh. Died April 23rd, 1960, aged 74 years.

PERSONAL

Births

KIDD.—On April 18th, 1960, to Joyce (*née* Hutchinson) and Alastair Kidd, B.V.SC., M.R.C.V.S., of 92, Seymour Park Road, Marlow, a son, Michael Robert.

ROBERTSON.—At Raigmore Hospital, Inverness, on April 25th, 1960, to Mr. and Mrs. W. W. Robertson, M's.R.C.V.S. (Jean Wilson), The Surgery, Main Street, Lairg, Sutherland, a son.

SMITH.—On April 12th, 1960, to Jane, wife of A. Michael Smith, B.A., VET.M.B., M.R.C.V.S., of Reading, a daughter, Frances Judith.

SMITH.—On April 24th, 1960, to Joyce, wife of Lawrance Blair Smith, B.V.M.S., M.R.C.V.S., of Broughton Astley, Leicester, a daughter.

Marriage

GEORGE—PARSONS.—On April 2nd, 1960, J. Kenneth George, M.R.C.V.S., of Cardigan, West Wales, to Janet E. Parsons of Holsworthy, North Devon.

COMING EVENTS

May

2nd (Mon.). Meeting of the East Yorkshire Clinical Club at the Talbot Hotel, Malton, 8 p.m.

4th (Wed.). Spring Meeting of the Eastern Counties Veterinary Society at Babraham Hall, Cambridge, 2.15 p.m.

Annual General Meeting of the South East Midlands Veterinary Association at the Grand Hotel, Northampton, 7.30 p.m.

Meeting of the Cornwall Veterinary Clinical Club at Gwendroe, Barrack Lane, Truro, 7.30 p.m.

5th (Thurs.). Annual General Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

6th (Fri.). Annual Dinner of R.V.C.A. at the Royal Veterinary College, Camden Town, N.W.1, 6.30 p.m.

Annual Dance of Midland Counties Veterinary Association at Eaton Lodge Hotel, Rugeley, 8 p.m. to 1 a.m.

Meeting of the Mid-West Veterinary Association at the Berkeley Café, Clifton, Bristol, 2.30 p.m.

11th (Wed.). Annual General Meeting of the B.S.A.V.A. Midland Area at the Queen's Hotel, Birmingham, 8 p.m.

12th (Thur.). Meeting of the South-Eastern Veterinary Association at the Royal Star Hotel, Maidstone, 7 p.m.

13th (Fri.). Meeting of the Welsh Branch at the Belle Vue Hotel, Aberystwyth, 2.15 p.m.

18th (Wed.). Meeting of the Lancashire Veterinary Association at Chester, 7.30 p.m.

20th (Fri.). Annual General Meeting of the Midland Counties Veterinary Association at Avoncroft Cattle Breeders Ltd., Sugarbrook.

21st (Sat.). Annual Reunion and Dinner Dance of the Chiron Club at the Grand Atlantic Hotel, Weston-super-Mare, 7 p.m.

22nd (Sun.). R.V.C. Annual Motor Rally to Beachy Head.

25th (Wed.). R.C.V.S. Day.

June

10th (Fri.). Annual Dinner of the R.A.V.C. Officer's Club at the Naval and Military Club, 94, Piccadilly, London, W.1.

July

6th (Wed.). Meeting of the Technical Development Committee of the B.V.A., at 7, Mansfield Street, 10.30 a.m.

August 28th to September 3rd. 78th Annual Congress of the British Veterinary Association in Glasgow.

DISEASE AMONG FOXES

The Masters of Foxhounds Association and veterinary surgeons of the Animal Health Trust are making great efforts to identify the disease that has been killing foxes in such numbers in various parts of the country (says a note in *Horse and Hound*).

Last week Dr. W. R. Wooldridge, scientific director of the Trust, and Mr. R. Bowden, from the canine station, who have been conducting intensive research into the disease, made a preliminary report of their investigations. Present at a meeting for the purpose were the Duke of Beaufort, Lord Halifax, Sir Ralph Clarke and other M.F.H.A. committee members.

Dr. Wooldridge said they had examined a large number of fox carcases and it had been established that the trouble is due to a virus. There is little evidence that the disease is being transmitted widely to other animals. Several dogs have contracted it, but in every case the disease has been mild in character and none of these few dogs has died.

Not yet having had the opportunity to study the disease in a living victim the scientists are at a considerable disadvantage, and their difficulties are many.

They made a very fair report, however, and it is pretty certain that before long they will establish beyond doubt the cause of this trouble.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Dumfries. West Glen Farm, New Abbey (Apr. 19).

Fife. Powguild Farm, Cardenden (Apr. 20).

Kirkcudbright. Blackcraig Farm, Borgue; Herrisdale Park, Haugh of Urr, Castle Douglas; Isles Farm, Dalbeattie (Apr. 19).

Northants. The Cottage Meadow, Fotheringay, Peterborough (Apr. 19).

Perth. Moneydie Farm, Luncarty, Perth (Apr. 19).

Foot-and-Mouth Disease

Surrey. Horton Estate Farm, Horton, Epsom (Apr. 19).

Fowl Pest

Beds. 18, Moor End, Eaton Bray, Dunstable (Apr. 14); 88, Totternhoe Road, Eaton Bray, Dunstable; Bower Lane Allotments, Eaton Bray, Dunstable; Horse Hills, Luton Road, Toddington, Dunstable; 17, Brook Lane, Great Barford; Bellows, Mill Road, Eaton Bray, Dunstable; 96 High Street, Eaton Bray, Dunstable (Apr. 15); The Green, Edlesborough, Dunstable; Moor End Farm, Eaton Bray, Dunstable (Apr. 17); 11, Greenways, Eaton Bray, Dunstable (Apr. 18); Ley Farm, Totternhoe, Dunstable (Apr. 19); Yew Tree Farm, Eaton Bray, Dunstable; Lockington Farm, Totternhoe, Dunstable; 102, High Street, Eaton Bray, Dunstable (Apr. 20).

Bucks. Castle Farm, Tingrith, Bletchley (Apr. 17).

Cambs. Marshall House, Wisbech Road, March (Apr. 21).

Essex. The Malt House, Widdington, Saffron Walden (Apr. 14); Howe Farm, Debden, Saffron Walden; Radwinter End, Saffron Walden (Apr. 15).

Hants. Barley Mow Farm, Winchfield, Basingstoke (Apr. 15); Park View Poultry Farm, Whitchurch (Apr. 21).

Herts. Holly Lane Poultry Farm, Bowers, Harpenden (Apr. 21).

Hunts. Somersham Road Farm, St. Ives (Apr. 19); College Farm, Somersham, St. Ives (Apr. 20).

Leics. Oxey Farm, Tilton-on-Hill, Loddington (Apr. 20).

Lincs. Post Office, Great Ponton, Grantham (Apr. 19).

Middx. The Bungalow, Cattlegate Road, Crews Hill, Enfield (Apr. 14).

Norfolk. Green Croft, Lyng, Norwich; Mill House, Wortham, Ling, Diss (Apr. 15).

Notts. The Roughs, Jockey Lane, Elkesley, Retford; Wycar Leys, Bilsthorpe, Newark (Apr. 15); Inkersall Site No. 1, Bilsthorpe, Newark; Inkersall Site No. 2, Bilsthorpe, Newark (Apr. 17); Belle Eau Park, Bilsthorpe, Newark (Apr. 18); Primrose Hill Farm, Bilsthorpe, Newark (Apr. 20); 4, Deerdale, Bilsthorpe, Newark; Grange Farm, Bothamsall, Retford (Apr. 21).

Rutland. Glebe Farm, Exton, Oakham (Apr. 15).

Surrey. Morley House, Thorpe, Egham (Apr. 15).

Warwicks. Inkford Cottage, Alcaster Road, Wythall; New Grounds House, Ardens Grafton, Alcester (Apr. 15); 21, May Lane, Hollywood, Birmingham; 31, Westfield Avenue, Hollywood, Birmingham (Apr. 17); Parsonage Farm, Great Packington, Meriden, Coventry; View Hulloa, Station Road, Berkswell, Coventry; Wayside, Warwick Road, Heronfield, Knowle, Solihull; 29, Needlers Lane, Balsall Common, Coventry (Apr. 19); 34, Rising Lane, Chadwick End, Solihull; 25, Barley Green Road, Knowle, Solihull; Brick Hill Cottage, Coleshill Heath Road, Coleshill, Birmingham; Old Tithe Barn, Church Hill, Coleshill, Birmingham; Premises rear of Lindridge Road, Erdington, Birmingham (Apr. 20); Red Road, Little Kineton (Apr. 21).

Worcs. Barn Close Field, Droitwich (Apr. 14); The Hollies Farm, Franche, Kidderminster; 25, Dag Tail Lane, Crabbs Cross, Redditch (Apr. 15); Spitten Cottage, Abbots Lench, Evesham (Apr. 19).

Swine Fever

Cambs. Cambria, Prickwillow Road, Isleham, Ely (Apr. 14).

Ches. Green Lane Farm, Heaton Moor, Stockport; Field Farm, Wrenbury, Nantwich (Apr. 19).

Derbys. 2, Chequers Lane, Nottingham Road (Apr. 14).

Devon. Burrow Farm, Broadclyst, Exeter (Apr. 19); Middle Boasley, Bratton Clovelly, Okehampton (Apr. 21).

Essex. Park Farm, Thaxted, Dunmow; Nursery Farm, Woodham Mortimer, Maldon; Hawk Lodge, Hawkswood Road, Downham, Billericay (Apr. 19); Kingstons Farm, High Easter, Chelmsford (Apr. 20); Little Rakefairs, Great Easton, Dunmow (Apr. 21).

Hants. Whitecroft Farm, Newport, Isle of Wight (Apr. 19).

Kent. Vincent Farm, Manston Road, Margate (Apr. 19).

Lancs. Brooklands, Narrow Moss Lane, Ormskirk; Osbaldeston House Farm, Higher Walton, Walton-le-Dale, Preston (Apr. 19); Turbary House Farm, Chainhouse Lane, Whitestake, Preston (Apr. 20).

Lincs. East Heckington, Boston (Apr. 20).

Norfolk. Lodge Farm, North Burlingham, Norwich (Apr. 19).

Suffolk. Dairy Farm, Ilketshall, St. Andrew, Beccles (Apr. 20).

Sussex. Lidsey Lodge Farm, Lidsey, Bognor Regis (Apr. 20); Boons Hill Farm, Playden, Rye (Apr. 21).

Yorks. 27, Nursery Road, Swallownest, Sheffield (Apr. 20).

XUM

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

"A Bovine"

Sir,—May I call your attention to certain inadequacies in "The Well of English" referred to in your issue of April 16th? *Canis familiaris* we know as "the dog" in whatever form it may take; *Equus caballus* as "the horse"; "the pig," "the sheep," and "the goat" we also recognise as common names for zoological species, but we lack a suitable synonym for *Bos taurus*. Unless the age and sex is known we cannot refer to this animal except by the plural "cattle," without going to such a ridiculous length as "any individual referable to the species *Bos taurus*," which would be unpleasing to an editor. Even "ox" is no longer generic; quoting the (Shorter) O.E.D., this word is "commonly used as applied to the male, castrated and used for draft purposes, or reared to serve as food."

Use of the word "ingest" reveals another inadequacy. It certainly seems much too grand for the accidental taking-in of a micro-organism, but to "eat" the microbe would imply biting and chewing, with salivation and expenditure of muscular energy, etc., a conscious process, accompanied by a certain amount of pleasure, which again does not seem appropriate.

I know that your contributors do wrong, but I should like to offer this as an excuse for some of the wrongdoing.

Yours faithfully,
E. L. TAYLOR.

Central Veterinary Laboratory,
Ministry of Agriculture,
Weybridge.
April 19th, 1960.

Iron-Dextran Therapy

Sir,—For some years iron-dextran preparations have been used at this Station and recommended to veterinary surgeons for use intramuscularly in cases of iron-deficiency anaemia, as reliable, easily and accurately administered agents for horses. Haematological and clinical responses have been good or excellent. In appropriate cases the compound marketed as "Imferon," made by Messrs. Benger Laboratories Ltd., has proved an excellent source of iron for short-term utilisation by the haemopoetic tissues.

During the last 3 years, a number of reports have been published which show that either intramuscular or subcutaneous injections of "Imferon" into rats and mice may produce local sarcomas. These reports have been critically reviewed in a recent editorial of the *British Medical Journal* (March 12th, 1960), which concludes its article as follows: ". . . but the existing evidence is certainly sufficient to warrant, and indeed to demand, its (Imferon's) speedy withdrawal from any kind of general use in man . . ."

Haddow and Horning (1960) showed that the dextran part of iron-dextran was not carcinogenic. The carcinogenic response appears to be related to the total amount of iron repeatedly administered intramuscularly at one site.

In these experiments with rats and mice, latent periods occurred up to 9 to 14 months before development of the sarcomas. In one lot of 30 rats injected, 20 developed sarcomas, and among a batch of 37 mice, 27 developed these tumours in Haddow and Horning's work.

Summarising the incidence of sarcomas in rats and mice injected with "Imferon," out of 131 animals, 87 developed sarcomas. This is an unusually high incidence of positive results for a carcinogenic agent, and has already opened up a wide field of experimental endeavour devoted to problems of cancer research.

However, the possible implications of the use of iron-dextran compounds in those domesticated animals which require iron depôt therapy, must be carefully reconsidered in the light of the findings in rats and mice.

It should be clearly appreciated that at present there is no evidence of any carcinogenic effect in species other than rats and mice. Very considerable amounts of "Imferon" and "Imposil" (which contains more iron) have been used in piglets to prevent iron deficiency anaemia without any evidence of adverse effects, and indeed with marked benefits. On the other hand, pigs for pork or bacon production reach the abattoir far sooner than the 9 to 14 months which elapsed in rodents before sarcomas developed, and it is a ground for speculation whether some pigs kept for breeding later and injected perhaps more than once with "Imferon" may ultimately develop sarcomata. There is also the question of actual amount of iron deposited locally in the muscle. The experimental rats and mice were given repeated and massive doses, many times greater than normal therapeutic amounts. The young pig, injected once only with "Imferon," may not have received a sufficient amount of metallic iron to induce sarcoma formation, if indeed its tissues are suitably reactive to do so.

The manufacturers, Benger Laboratories Ltd., published a statement in *The Times* of March 16th which states that they ". . . have decided to suspend sale for general use of their drug 'Imferon' . . ." No specific mention is made of veterinary applications.

With the experimental evidence now available, we feel that we must, for the time being, discontinue the use of iron-dextran at the Equine Research Station for repeated administration since this may be dangerous. At this time there is no evidence that any neoplastic reaction has followed the clinical use in man or the horse either of "Imferon" or of "Imposil." A local inflammatory change has occasionally been seen, but this has been purely temporary. We do not, however, feel that there are objections to the use of this agent *once only* in the treatment of such disorders as piglet anaemia where in the majority the expectation of life of the subject is relatively

short, and where alternative methods of giving iron are particularly awkward.

We regret the decision not to use "Imferon" and "Imposil" in the horse since these products are the result of a considerable amount of excellent research work undertaken by the scientific staff of the manufacturers, but as the *British Medical Journal* points out, it is ". . . necessary to preserve a balance of judgment, and certainly not to be stampeded . . ." For the present, the results of further research work will be awaited with great interest, and a final decision must be deferred.

Yours faithfully,
WM. C. MILLER.
R. K. ARCHER.

Equine Research Station,
Animal Health Trust,
Newmarket.
April 10th, 1960.

References

ANON. (1960). *Brit. Med. J.* **1.** 788.
HADDOW, A., & HORNING, E. S. (1960). *J. Nat. Cancer Inst.* **24.** 109.
THE TIMES (1960). Issue No. 54721, page 12, March 16th.

Sir,—Mr. Wm. C. Miller and Dr. R. K. Archer have kindly advised us on the text of their letter to you on the subject of iron-dextran therapy. We would appreciate the opportunity of making simultaneously some relevant comments.

It should be emphasised that in the experiments referred to by Mr. Miller and Dr. Archer the injections were of a magnitude and the technique such as to place the work in a field far removed from standard clinical and veterinary practice. The many injections given repeatedly into the same small volume of rodent tissues are equivalent to the administration of 110,000 ml. of iron-dextran or 5,500 grammes of iron to a 10 cwt. horse! In veterinary practice the usual equine dose seldom exceeds in total 200 ml. iron-dextran or 10 grammes of iron.

In the rabbit and guinea-pig no tumours have been produced even with the same colossal overdosage as was given to rodents. Furthermore, we have evidence (Golberg, 1960) that the sequence of injection site changes caused by massive overdosage with iron-dextran is in many respects peculiar to mice and rats and has no parallel in the dog or pig.

It is clear from all experimental evidence in our possession there is no likelihood of neoplastic changes developing in larger animals as a result of normal clinical veterinary procedure with this product.

Yours faithfully,
L. GOLBERG.

Research Department,
Benger Laboratories Ltd.,
Holmes Chapel,
Cheshire.
April 26th, 1960.

Reference

GOLBERG, L. (1960). *Brit. med. J.* **1.** 958.

Clinical Studies on "Abu Nini"

Sir,—Great importance is attached to the work by Dr. E. Otte on "abu nini," a contagious disease of goat and sheep in the Sudan (Otte, 1960). The clinical description given by the author in his paper is very suggestive; however, I think that the following suggestions could be made.

Work done during nearly 5 years in this laboratory located in Chad, an area with the same ecological conditions as those in Khartoum, seems to indicate that the picture is not so clear as indicated in the paper, especially on aetiological grounds. I agree generally with Dr. Otte's description of the symptoms and pathology of the disease, but research on the aetiological agent(s) has shown that several of them could induce such pathological features:—

Mycoplasma caprae must be regarded as the most common agent responsible for this condition. It is a fact that it could easily be missed in attempted cultural isolations, especially when ox serum is used in routine media. In this connexion horse serum seems to be preferable, combined with a rich basic medium such as Difco B 60 plus yeast extract. Nevertheless, the organism cannot be isolated on some occasions. Aerosols of the organism reproduce the disease in its thoracic form.

A virus, belonging to the Chlamydozoon group of viruses, has been isolated (Provost, 1957). This virus has affinities for both lung and genital tract, and is also pathogenic for human beings. The condition which it reproduces in the goat closely resembles the septicaemic form described by Dr. Otte.

The rickettsia of heart-water, *Cowdria ruminantium*, can be found with the same pathological conditions, especially in the thoracic form, associated or not with *M. caprae*.

It is my opinion that the disease described in the Sudan, closely similar to that observed in Chad, is not a single entity but rather a syndrome which could be induced by several distinct agents. The importance of stress (cold, hard journey, and even disturbance in the habits of goats) has not to be neglected; it plays certainly a most significant rôle in setting up this syndrome, especially when the Chlamydozoon virus and *C. ruminantium* infections are concerned.

This condition in the goat appears to be widespread in this tropical part of Africa, from the western to the eastern coast. It is suspected to occur in Senegal in the same time as "Peste des petits ruminants" (Mornet, 1956).

In conclusion, may I point out that Curasson observed the disease he described under the name "Pleuropneumonie infecticuse de la chèvre" in West Africa and not in North Africa as Dr. Otte claimed.

Yours faithfully,
A. PROVOST.

Institut D'Elevage et de Médecine Vétérinaire des Pays Tropicaux,
Laboratoire de Farcha,
Fort-Lamy (Tchad).
April 14th, 1960.

References

MORNET, P., *et al.* (1956). *Rev. Elev. Med. vet. Pays trop.* **9.** 313.
OTTE, E. (1960). *Vet. Rec.* **72.** 140.
PROVOST, A. (1957). *Rev. Elev. Med. vet. Pays trop.* **10.** 113.

Virus Diseases and Nephritis

Sir,—We are treating virus diseases in small animals to-day mostly by antibiotics of one kind or another, but in many cases one fails to reduce temperatures or effect a cure. We do not seem to recognise any non-specific therapy, although there is one which may well be regarded as at least 50 per cent. effective.

I refer to *crude* liver which can be administered either parenterally or as a liquid or solid *per os*. In past years I employed a capsule of dried liver substance plus iron, but the unavoidably large size of the capsule made it difficult to administer. The injection of crude liver is very painful and might induce a fit in such patients as are already so inclined in consequence of being infected with a neurotropic disease.

Then I went on to a crude liver liquid extract* which was capable of exerting its therapeutic effect even when administered *per os*. The bulk in this case was not detrimental nor resisted by the patient.

At the same time, in cases of chronic nephritis of the dog this liver extract proved of great value in the alleviation of the secondary symptoms, *i.e.* emesis, thirst and anorexia.

One does stave off anaemia and cachexia, but albuminuria is not decreased. Yet a dog so diseased may live a happier life for a considerably longer period when treated by crude liver provided it is maintained indefinitely. Clients have said that if they discontinued this treatment, symptoms reappeared.

I write these few lines in the hope that the above advice may help any colleague who is faced with problems of this sort.

I have to thank Messrs. Silten Ltd. for kindly providing me with a quantity of the elixir for trial purposes.

Yours faithfully,
HAMILTON KIRK.

Loddon Drive,
Wargrave,
Berks.
April 25th, 1960.

* Heplastol elixir.

"Progress"

Sir,—May I be permitted to reply to your correspondent, Mr. John E. Sheppard (*Vet. Rec.*, April 9th)?

To reply to his specific points, the bottle of "mixture" is usually given as a course of treatment which should be completed, *i.e.* a course of sulphonamide or antibiotic therapy requiring treatment over several days even after the animal is better to ensure that recovery is complete and to reduce the likelihood of producing drug resistance. Even the college trained herdsmen of this modern age still do not realise the importance of a completed treatment—the use of the single tube of veterinary cerate at the first appearance of a clot of dried milk on the strip cut is a certain demonstration of this point, and of the fact that professional skill is of benefit in detecting the abnormal pathological process.

As to a subcutaneous injection of calcium borogluconate, I presume that the emergency is one of milk fever, and in such an emergency an intravenous injection done in the knowledge that it is the right treatment is surely much better when the life of a dairy cow is at stake. We all know the unfortunate prospects of being called to a recumbent and depressed cow which has received several bottles of calcium subcutaneously because she wouldn't rise quickly.

Repeated visits to an animal may appear as a problem to the farmer, and indeed to the veterinary surgeon who wishes to keep his fees economic, but I would assure your correspondent that the interests of his herd are being considered. We must be assured having taken on a case that the case is proceeding to a satisfactory conclusion, that the animal is responding to the treatment prescribed. We know too well that many stockmen cannot be relied upon to report the progress of a case, or indeed to appreciate the clinical signs that indicate that all is not so well with the animal concerned. These are looked out for at the return visits.

In these days when the animal population is worth so much more, the old adage "a little knowledge is a dangerous thing" might well be applied. Of course the herdsman and his veterinary surgeon should work as a team, the former with his responsibilty for the normal working of the herd or flock, and the latter with his responsibility for the relief of disease and such preventive measures as he deems it necessary should be advised.

The veterinary profession has its job to do and will do it fairly for proper fees, but the present do-it-yourself attitude of the farming community is the surest way to "lose a pound quickly," and at their own expense.

Yours faithfully,
R. B. STEVENSON.

Amery Farm,
Alton,
Hants.
April 18th, 1960

Fractured Skull in the Bovine Animal

Sir,—I was most interested in the clinical note on "Fractured Skull in the Bovine Animal."

Some 18 months ago I was called to examine the carcase of a 2½-year-old Friesian bull. This bull was being led along the right side of a busy road by two men, one on either side, when a car came level from behind. The bull turned its head, the left horn went through the car's window, and the pillar of the car door came into contact with the base of the left horn.

The bull collapsed and died immediately. *Post-mortem* examination showed a fracture ring round the base of the left horn through both parietal and frontal bones. There was little or no haemorrhage.

The car had a small dent in the door pillar.

Yours faithfully,
M. J. R. STOCKMAN.

74 Wood Street,
Barnet.
April 25th, 1960.